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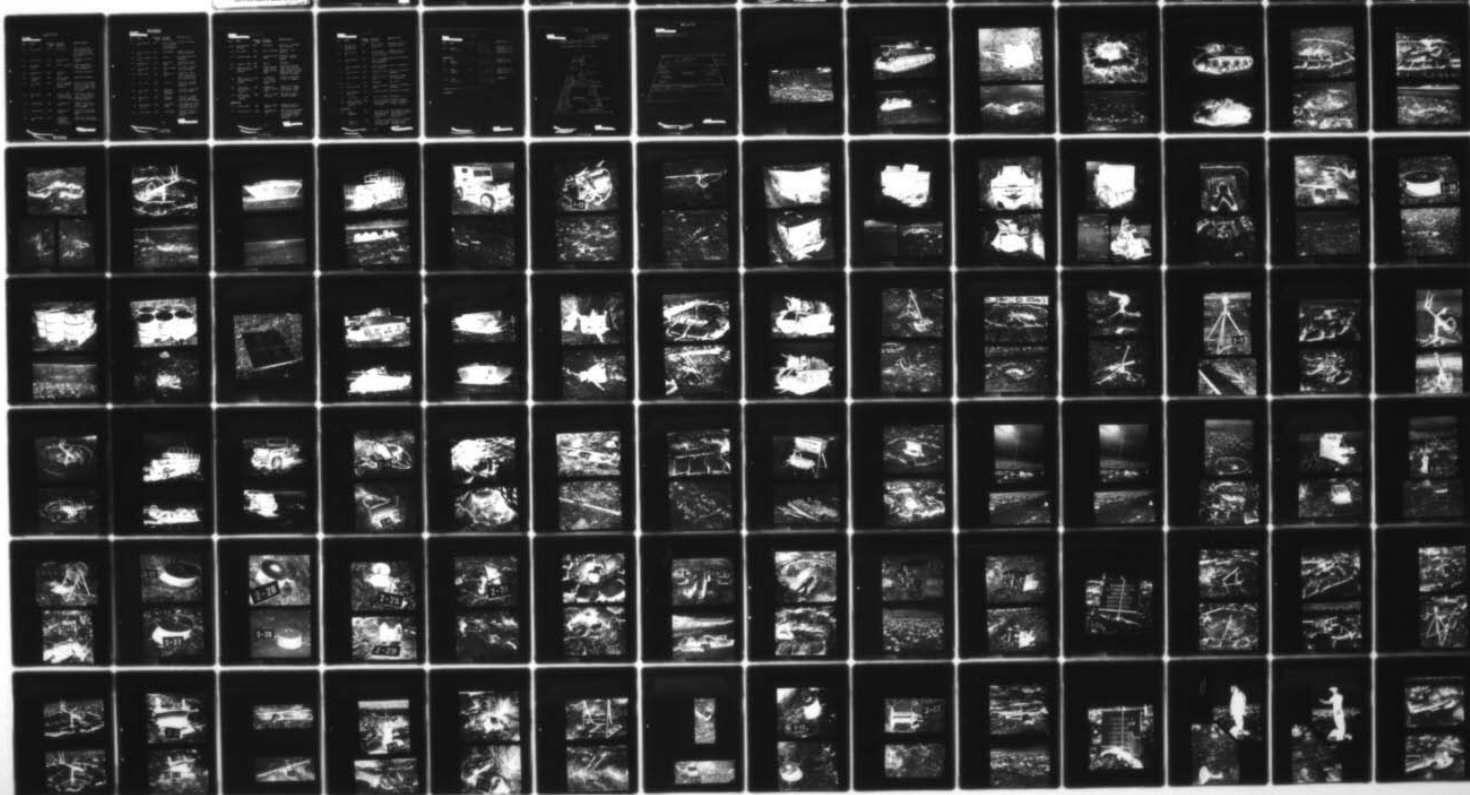
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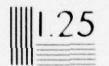




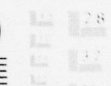
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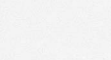
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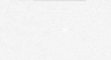
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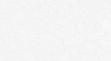
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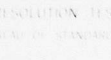
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MICROCOPY RESOLUTION TEST CHART
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By Regis Chisley Date 8 Aug 1979

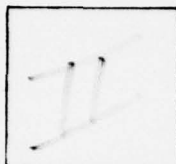
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INVENTORY

Exercise Desert Rock V - Marine Corps
Annex ABLE - Demonstration of Effects
of Atomic Explosion on Equipment and Clothing
DOCUMENT IDENTIFICATION Photographic Supplement

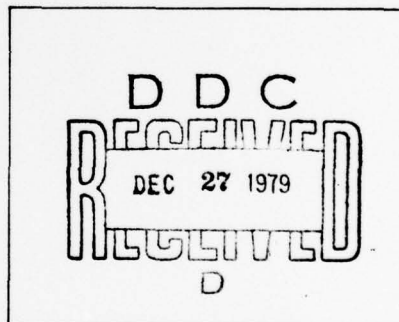
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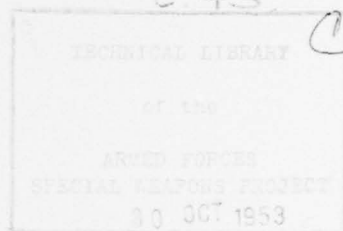
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2D MARINE CORPS PROVISIONAL
ATOMIC EXERCISE BRIGADE
CAMP DESERT ROCK
NEVADA
18 APRIL 1953



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3D MARINE DIVISION PHOTOGRAPHIC SECTION
1ST LT. FREDERICK MOELLER JR., OIC



Ground Zero

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2d Marine Corps Provisional
Atomic Exercise Brigade
Camp Desert Rock, Nevada

Annex ABLE to Report of Exercise Desert Rock V - Marine Corps

DEMONSTRATION OF EFFECTS OF ATOMIC EXPLOSION
ON EQUIPMENT AND CLOTHING

1. PURPOSE OF THE DEMONSTRATION:

a. To demonstrate the effects of the atomic explosion on Marine Corps equipment, and on personnel, at various distances and in various attitudes and degrees of cover.

2. a. To accomplish the above, equipment and clothing (on dummies to simulate personnel) layouts were prepared in five (5) positions at different distances as follows:

- (1) Position #1 - 500 yards, extending to 650 yards, from ground zero.
- (2) Position #2 - 1000 yards, extending to 1100 yards, from ground zero.
- (3) Position #3 - 1700 yards, extending to 1750 yards, from ground zero.
- (4) Position #4 - A special dummy position 1700 yards from ground zero.
- (5) Position #5 - A special dummy position (similar to #4) 2600 yards from ground zero.

b. In positions #1, #2, and #3, various items of equipment, and dummies clad in utility clothes and khaki, were placed in varied attitudes and directions with respect to the point of the burst and, further, were situated with various degrees of protection in the form of foxholes and emplacements. Positions #4 and #5 each contained three dummies, two standing and one prone, clad in different combat uniforms.

c. Appendix (1) "Apparent Effects of Atomic Explosion", lists the items placed in the respective positions in the order of proximity to ground zero, and indicates (1) distance of each item from GZ, (2) degree and attitude of exposure, and (3) apparent effect of the explosion on items displayed. In general, and as far as equipment available would allow, similar items, in similar disposition, were displayed in all positions (particularly #1 and #2) to show the contrast of effects in different distances.

d. To facilitate the examination of the demonstration by the troops in the exercise, positions #1, #2, and #3, were split, so that half of the items of each of these positions were on either side of the allocated sector. For details of layout, see Appendix (2).

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3. The following general effects were produced at the respective positions:

a. POSITION #1

(1) With one or two minor exceptions, all of the equipment situated in this position was severely damaged or totally destroyed. With the exception of the tank and the 105mm motor carriage M7, all of the exposed vehicles were demolished, with parts scattered great distances. The vehicles that were dug in were noticeably less damaged than those exposed but they, too, were heavily damaged. With exception of the emplaced 81mm mortar and the rifle and carbine in the foxhole with the dummy, all of the light equipment was severely damaged or destroyed, the emplaced items as well as those exposed. Although parts were blown from the M7 and the turret blown from the tank, both landed upright with tracks apparently undamaged, and it is possible that they might have been capable of moving under their own power. Though covered with a thin layer of dirt, the dummy in the foxhole was still intact (an individual in this foxhole would have received a lethal dose of radiation). His clothing was slightly tattered, due apparently to the drag associated with the high overpressure in that region. In contrast to the exposed fuel dump, which was scattered for some 200 yards by the blast, the emplaced fuel dump was intact though partially buried.

(2) It is estimated that the energies transmitted to the position were approximately:

(a) Forward end:

Blast - 45 psi
Thermal - 240 Cal/sq cm
Nuclear - 65,000 r.

(b) Rear end:

Blast - 18 psi
Thermal - 150 Cal/sq cm
Nuclear - 23,000 r.

b. POSITION #2

(1) In contrast to the effects at position #1, the heavy vehicles (Tank, M7 and LVT) suffered comparatively little damage at this position. The two trucks, however, were severely buffeted by the blast, both being thrown nearly 50 feet and landing upside down. They appeared severely damaged. Infantry weapons, even those exposed, stood up well in this position. Those in emplacements, for the most part were undamaged. Small, but light equipment (radios, switchboards, etc.) suffered moderate to severe damage if exposed, but little or no damage if dug in. One exception to the latter was a switchboard in a rather poor emplacement.

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The ration dump excellently illustrated the value of cover, the exposed dump being littered over a broad area while the emplaced dump was comparatively undisturbed. The dummy in the foxhole was entirely shielded from all effects of blast and thermal radiation.

(2) It is estimated that the energies transmitted to the position were approximately:

(a) Forward end:

Blast - 12 psi
Thermal - 70 Cal/sq cm
Nuclear - 3200 r.

(b) Rear end:

Blast - 10 psi
Thermal - 55 Cal/sq cm
Nuclear - 2000 r.

c. POSITION #3

(1) At this position, approximately one mile from Ground Zero, all items with the exception of the trucks and dummy received slight damage. The truck sustained damage from both blast and thermal radiation and the exposed dummy was burned. Had this dummy been in a foxhole, even a relatively shallow one, it is considered that it would have escaped all effects of the weapon, including nuclear radiation, since the latter was at a low enough level at this distance to have been effectively shielded out. The estimated energies transmitted to this position are approximately:

Blast - 4.5 psi
Thermal - 24 Cal/sq cm
Nuclear - 200 r.

d. POSITIONS #4 and #5

(1) These positions were designed to show the contrast of the effects on exposed personnel at the two distances, particularly the thermal effects. It was felt with little doubt that the dummies at the nearer position would burn, and it was hoped that those at the further position would suffer no more than scorching. It turned out that all standing dummies in both positions were burned to some extent, while the prone dummies at both positions were relatively unharmed.

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APPENDICES:

1. Apparent Effects of Atomic Explosion.
2. Diagram of Equipment Demonstration.

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Same as report on Exercise Desert Rock V - Marine Corps.
Annex ABLE

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APPENDIX 1 to Annex ABLE of Report on Exercise
Desert Rock V - Marine Corps

APPARENT EFFECTS OF ATOMIC EXPLOSION

POSITION #1 (Unless specified otherwise, items were placed unprotected on open ground. Angles are with reference to a line from item to GZ.)

<u>No.*</u>	<u>Item</u>	<u>Distance</u> <u>(yds)</u>	<u>Pre-shot</u> <u>Situation</u>	<u>Apparent Effect</u>
1-1	Tank, M4A3	500	45 degrees to left.	Thrown 30'. Turret sheared off and thrown 20' from tank. Paint sandblasted off.
1-2	How, 105mm w/telescope sight	500	Dug in at 45 degrees.	Turned 90 degrees in emplacement. Pushed back 5'. Apparently operable.
1-3	Aiming circle M-1	500	Dug in, mounted on tripod.	Destroyed.
1-4	105mm Mortar Carriage, M-7	500	45 degrees to right.	Thrown 60'. Moderate damage to carriage (plates blown off) Paint sandblasted off.
1-5	Mortar, 81mm	550	Dug in; aimed at GZ.	Tube detached from base plate and thrown half out of emplacement. Bipod damaged.
1-6	MG, Cal .30, M1917A1	550	Dug in; aimed 30 degrees.	Blown out of emplace- ment. Barrel and jacket bent. Damaged beyond repair.
1-7	Rifle and Carbine	550	Wedged on sandbags, poin- ted at GZ.	Both thrown about 50'. Carbine stock broken, both stocks badly scarred.
1-8	MG, Cal .50, AA	550	Dug in; aimed 30 degrees and elevated 60 degrees.	Blown out of emplace- ment and destroyed.

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<u>No.</u>	<u>Item</u>	<u>Distance</u> (yds)	<u>Pre-shot</u> <u>Situation</u>	<u>Apparent Effect</u>
1-9	LVT (4)	570	45 degrees to right.	Thrown approx. 300', landing upside down. Hull severely bent and twisted; apparently beyond repair.
1-10	Truck, 2½ ton	580	45 degrees to left.	Thrown approx. 150', and demolished (wreckage in pieces).
1-11	Truck, ½ ton	580	45 degrees to right.	Thrown approx. 300', and demolished (wreckage in pieces).
1-12	Flame thrower, M-2	625	Strapped to sandbags in simulated prone position.	Thrown 60'. Severely damaged, twisted and bent.
1-13	Rocket launcher, M-9	625	On sandbags.	Thrown 150'. Severely bent. Beyond repair.
1-14	Van, Radar set SP-1M	625	Dug in, side-on to blast.	Unmoved. All sides and top blasted in. Damaged beyond repair.
1-15	Van, Radar set SP-1M	625	45 degrees to right.	Blasted approx. 400'. Demolished.
1-16	Power unit, radar set SP-1M	630	45 degrees to right.	Unmoved. Dented and bent. Damage moderate to severe.
1-17	Dehumidifier, Radar set SP-1M	630	Side-on.	Thrown approx. 200' and demolished.
1-18	Dummy in khaki w/rifle and carbine.	650	In prone fox-hole 4'x6'. 2½ feet deep.	Trousers on back slightly tattered. Rifle and carbine apparently undamaged.

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<u>No.</u>	<u>Item</u>	<u>Distance</u> <u>(yds)</u>	<u>Pre-shot</u> <u>Situation</u>	<u>Apparent Effect</u>
1-19	Rifle, carbine and telephone (EE-8)	650	Wedged in sandbags.	All thrown (distance unmeasured). Stocks of rifles badly scarred and partially burned. Telephone burned, hand set broken.
1-20	Wire on DR-4	650	Lying flat in open.	Thrown 50'. Wire insulation burned.
1-21	Fuel dump (Six 55 gal. drums of gasoline.)	650	Standing on end in open.	Drums scattered for distance of over 500'. Slightly bent, none ruptured.
1-22	Fuel dump (Six 55 gal. drums of gasoline.)	650	Dug in, standing on end.	Dump partially buried, but intact. No apparent damage.

POSITION #2

2-1	Tank, M4A3	1000	45 degrees to left.	Apparently unmoved. Paint burned and sandblasted.
2-2	LVT (4)	1000	45 degrees to right.	Thrown 50'. Turned 180 degrees. Side to blast slightly dished. Apparently operable. Paint burned and sandblasted.
2-3	How, 105mm w/telescope sight	1000	Dug in at 45 degrees.	No apparent damage.
2-4	Aiming circle, M-1	1000	Dug in, mounted on tripod.	Pulled out of position and destroyed.
2-5	105mm Motor Carriage M7	1000	45 degrees to right.	Displaced 3'. Front shield blown 100'. Apparently operable. Paint burned and sandblasted.

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<u>No.</u>	<u>Item</u>	<u>Distance</u> <u>(yds)</u>	<u>Pre-shot</u> <u>Situation</u>	<u>Apparent Effect</u>
2-6	Mortar, 81mm	1015	Aimed at GZ.	Tube detached from baseplate and thrown 8'. Apparently operable after re-assembly. (No sight).
2-7	Mortar, 81mm	1015	Dug in, aimed at GZ.	Undamaged, apparently unmoved.
2-8	MG, Cal.30. M1917A1	1015	Aimed 30 degrees.	Slightly displaced, light damage but apparently operable.
2-9	Aiming Circle M-1	1015	Mounted on tripod.	Thrown and destroyed.
2-10	MG, Cal.30. M1917A1	1015	Dug in, aimed 30 degrees.	Apparently undamaged.
2-11	MG, Cal.50, AA	1025	Aimed 30 degrees and elevated 60 degrees.	Thrown 60 feet. Shield blown off. Sight twisted out of shape. Apparently operable following repair.
2-12	MG, Cal.50, AA	1025	Dug in. Aimed 30 degrees, elevated 60 degrees.	Blown out of emplacement. Sight and shield damaged, but operable following repair.
2-13	Truck, 2½ ton	1025	45 degrees to left.	Thrown 45 feet, overturned. Appeared severely damaged.
2-14	Truck, ½ ton	1025	45 degrees to right.	Thrown 40', overturned. Appeared severely damaged.
2-16	Flame Thrower, M2	1040	Strapped to sandbags in simulated prone position.	Thrown 20'. Light damage. Bent tank and gun.

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<u>No.</u>	<u>Item</u>	<u>Distance</u> (yds)	<u>Pre-shot</u> <u>Situation</u>	<u>Apparent Effect</u>
2-17	Flame Thrower, M2	1040	Dug in, strap- ped to sandbags in simulated prone position.	No apparent damage.
2-18	Rocket Launcher, M-9	1050	On sandbags.	Thrown 10' but app- arently undamaged.
2-19	Rocket Launcher, M-9	1050	Dug in.	Partially buried but undamaged.
2-20	Switchboard, BD-72	1050	Standing in Open.	Thrown 30' and dam- aged beyond repair.
2-21	Switchboard, BD-72	1050	Dug in, stand- ing.	Torn apart, appeared severely damaged.
2-22	Radio, TBX	1060	Standing in Open.	Thrown 40'. Bent, twisted and torn a- part. Appeared dam- aged beyond repair.
2-23	Radio, TBX	1060	Dug in.	Blown over, but app- eared only slightly damaged.
2-24	Radio, SCR- 300.	1060	Standing, propped by sandbags.	Thrown 90'. Appeared severely damaged.
2-25	Radio, SCR- 536	1060	Lying on sandbags.	Thrown 12'. Slight- ly bent. Appeared only slightly damaged.
2-26	DR-4 (w/wire) on RL-31	1070	Axle 90 de- grees.	Drum broken from reel. Both thrown 40'. Wire insulation charred.
2-27	Wire on DR-4	1070	Lying flat.	Thrown 6'. Wire in- sulation slightly charred.

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<u>No.</u>	<u>Item</u>	<u>Distance</u> (yds)	<u>Pre-shot</u> <u>Situation</u>	<u>Apparent Effect</u>
2-28	Wire Dispenser, MX-306/G	1070	Lying flat.	Thrown 30'. Dispenser case scorched.
2-29	Reel, CE-11	1070	Lying on ground.	Thrown 50'. Wire charred.
2-30	Telephone, EES	1080	Propped by sand- bags.	Thrown 10'. Case scorched. Hand set broken.
2-31	Telephone, EES	1080	Dug in.	Undamaged.
2-33	Dummy in utili- ties w/rifle and carbine.	1080	Prone, pointed at GZ, rifles wedged on sand- bags.	Dummy thrown approxi- mately 150', clothing burned, stocks of rifles badly scarred. Rifles apparently undamaged.
2-34	Dummy in utili- ties w/rifle and carbine	1080	In foxhole 4'x 6' x 2½', positioned as above.	Covered by thin layer of dirt. No damage.
2-35	Ration dump (50 cases "C" ration)	1090	Stacked in squares 6 cases high.	Scattered for approx- imately 350'. Cases scorched but intact.
2-36	Ration dump (50 cases "C" ration)	1090	Dug in, stacked as above.	Top layer of cases slightly deranged.

POSITION #3

3-1	Mortar, 81mm	1700	Dug in, aimed at GZ.	Undamaged, still in original position.
3-3	Truck, 2½ ton	1700	45 degrees to left.	Cover burned and ripped off, all bows broken. All windows blown in. Hood dented. Paint scorched.

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<u>No.</u>	<u>Item</u>	<u>Distance</u> <u>(yds)</u>	<u>Pre-shot</u> <u>Situation</u>	<u>Apparent Effect</u>
3-4	MG, Cal .30, M1917A1 and aiming circle	1710	Dug in, aimed 30 degrees.	Undamaged, still in original position.
3-5	MG, Cal .50, AA	1710	Dug in, aimed 30 degrees, ele- vated 60 degrees.	Undamaged, still in original position.
3-6	Flame Thrower, M-2	1710	Strapped to sand- bags in simulated prone position.	Undamaged and unmoved.
3-7	Rocket Launcher, M-9	1710	Laid on sandbags at 30 degrees.	Moved 3', undamaged.
3-8	Radio, SCR 300	1720	Propped by sand- bag.	Moved 3', apparently undamaged.
3-9	Radio, SCR 536	1720	Propped by sand- bag.	Overturned. Appar- ently undamaged.
3-10	RL 31	1720	Standing.	Overturned.
3-11	Telephone, EES	1720	Propped by sand- bag.	Thrown 6'. Apparently undamaged.
3-12	Wire dispenser, MX-306/G	1730	Lying on ground.	Canvas case scorched.
3-13	Reel, CE-11	1730	Lying on ground.	Undamaged.
3-15	Dummy in utili- ties w/rifle and carbine.	1730	Prone, pointed at GZ, rifles lying on sandbags.	Clothing on dummy burned. Rifles not moved or damaged.

POSITION #4

4-1	Dummy (Manikin)	1700	Clad in cold wea- ther uniform w/ supplementary items.	All clothing burned and blasted off except winter underwear. Thrown 20'.
4-2	Dummy (Manikin)	1700	Clad in utilities w/helmet, stand- ing facing GZ.	Thrown 20'. clothing and dummy almost entirely burned.

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<u>No.</u>	<u>Item</u>	<u>Distance</u> (yds)	<u>Pre-shot</u> <u>Situation</u>	<u>Apparent Effect</u>
4-3	Dummy (home-made)	1700	Clad in utilities w/helmet, armored vest and torso armor.	Outer jacket burned on shoulders only (shoulders were pointing to GZ.) Moved 4'.

POSITION #5

5-1	Dummy (Manikin)	2600	Clad in utilities w/helmet, standing facing GZ.	Blown down. All clothing burned.
5-2	Dummy (Manikin)	2600	Clad in cold weather uniform, standing facing GZ.	Blown down. Outer layer of trousers charred and torn.
5-3	Dummy (Home-made)	2600	Clad in khaki, w/helmet, armored vest and torso armor.	Undamaged.

*Refer Appendix 2 for relative position of item.

APPENDIX 1

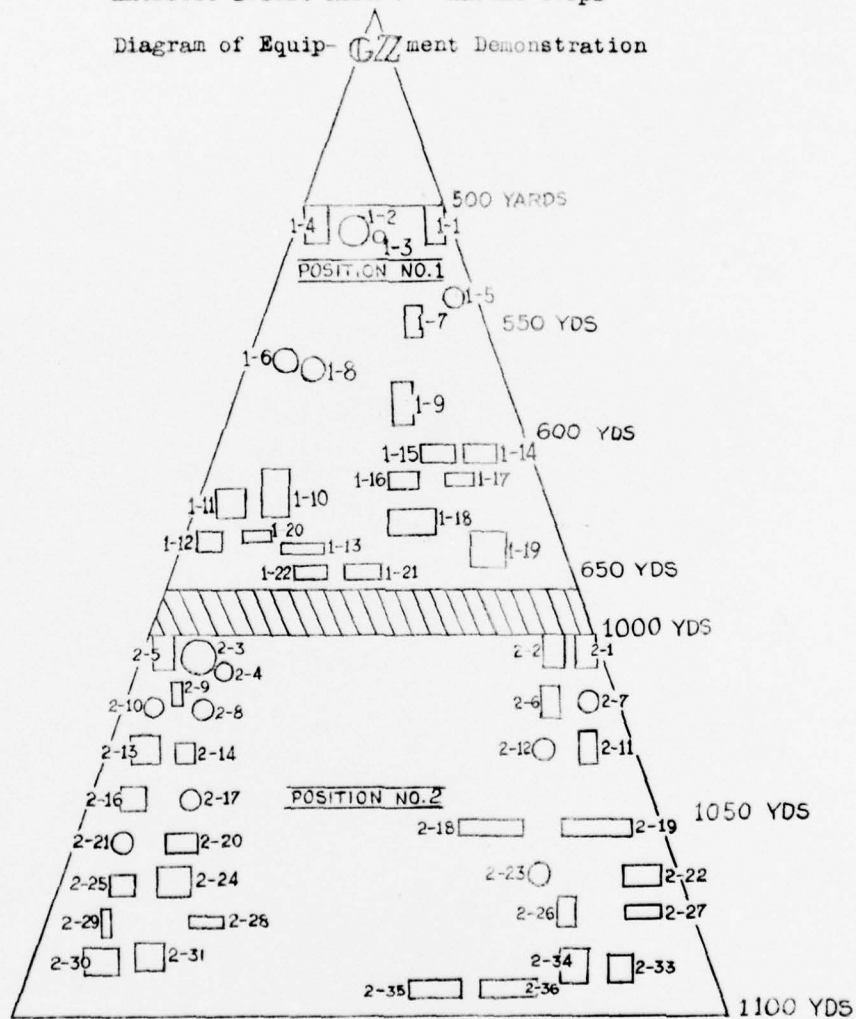
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2d Marine Corps Provisional
Atomic Exercise Brigade
Camp Desert Rock, Nevada

Appendix 2 to Annex ABLE to Report on
Exercise Desert Rock V - Marine Corps

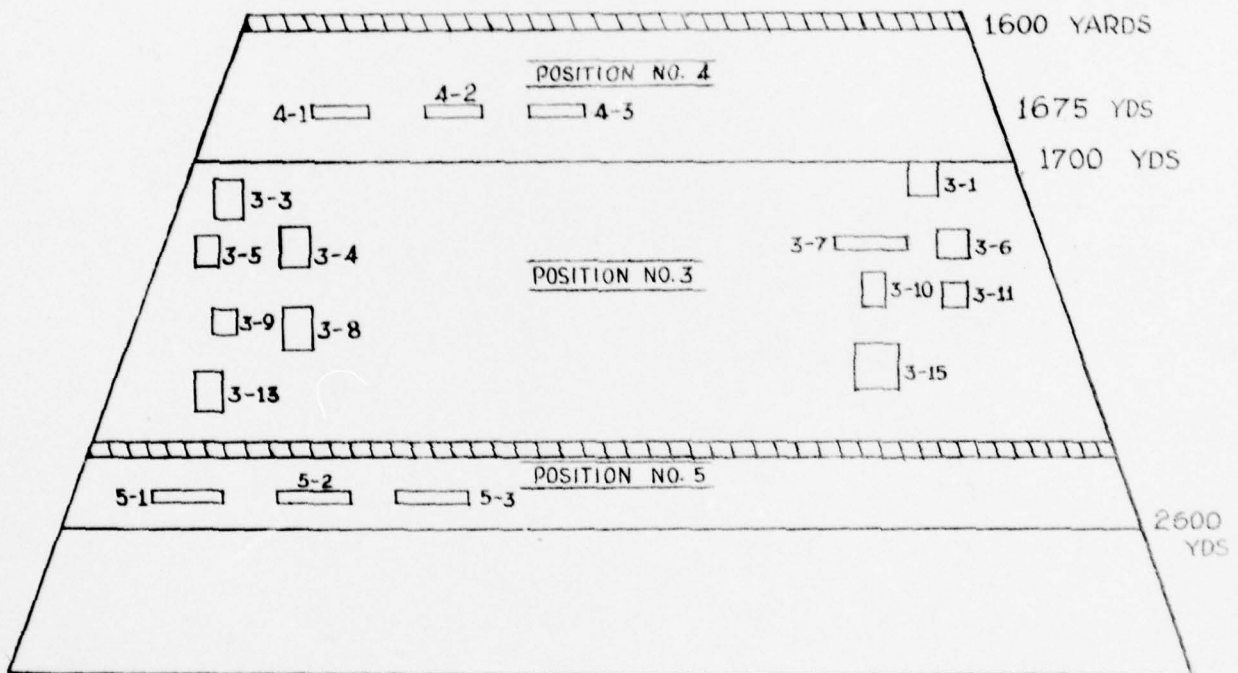
Diagram of Equip-~~GZ~~ment Demonstration



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Appendix 2 to Annex ABLE (Cont'd)

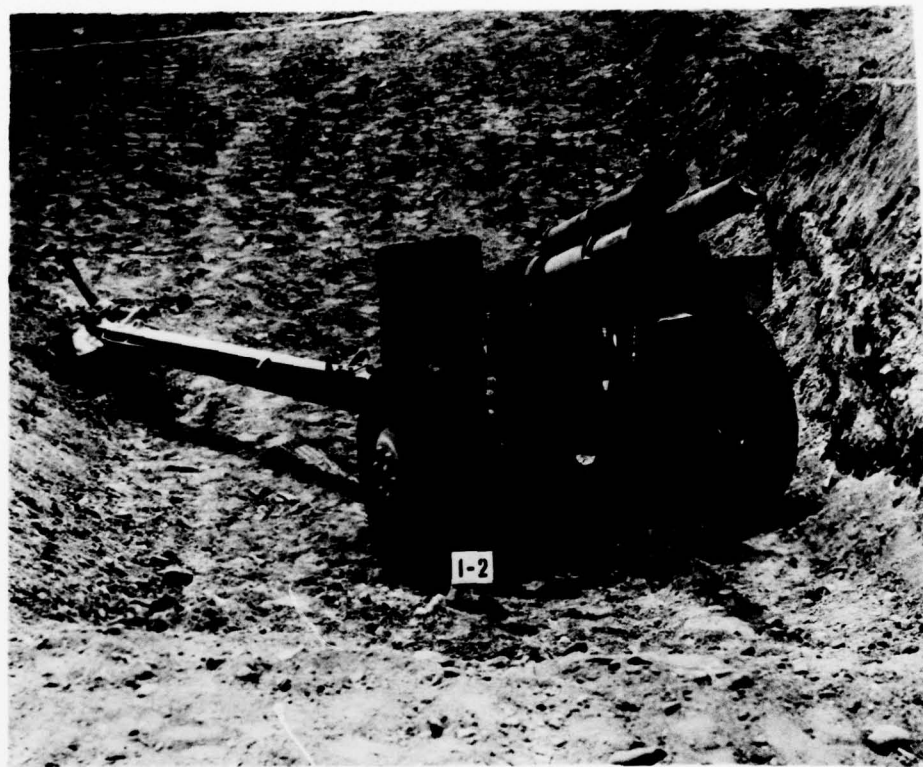


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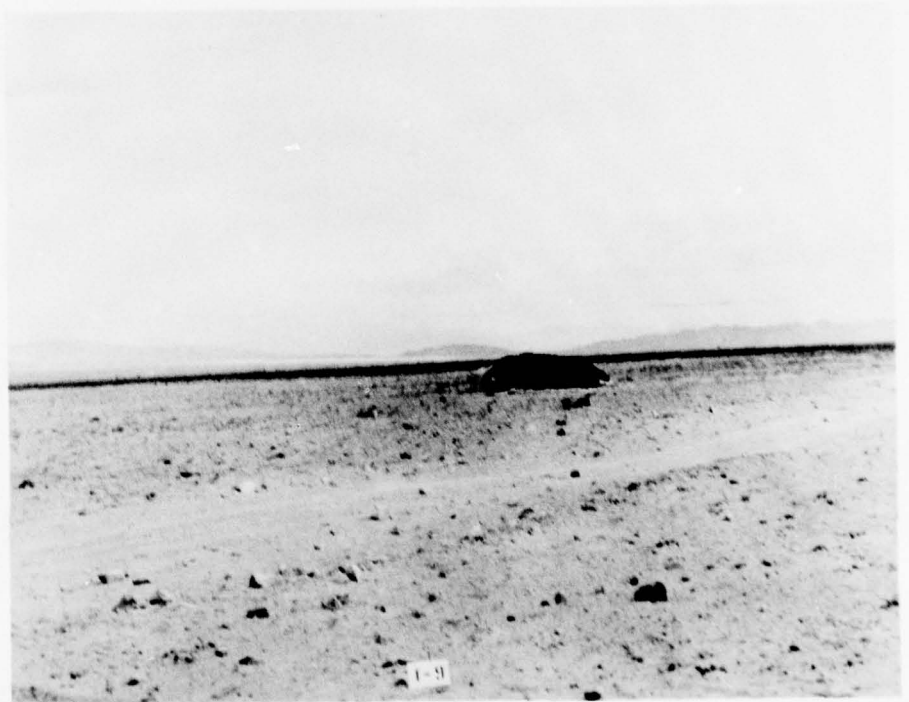
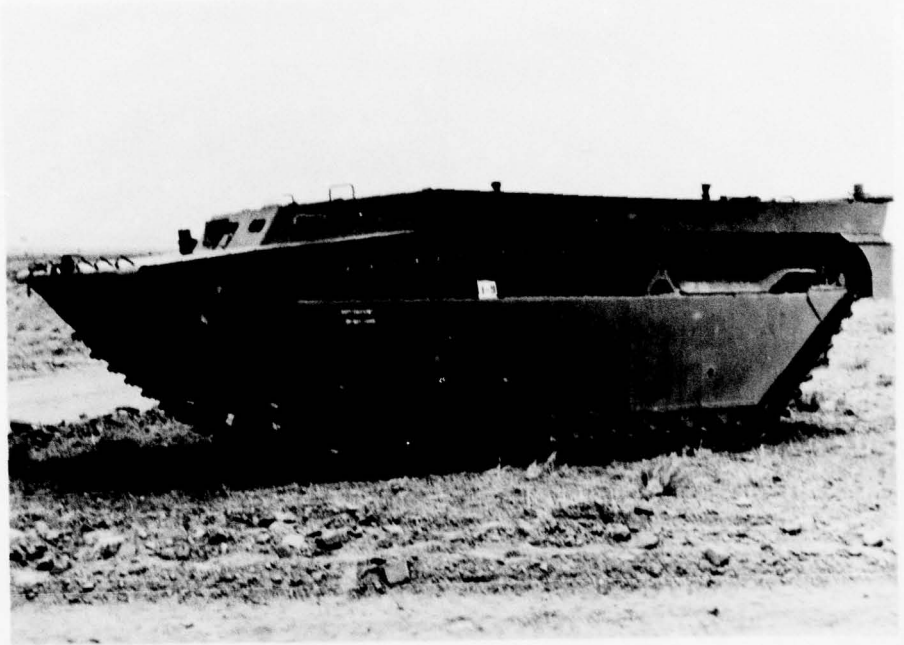


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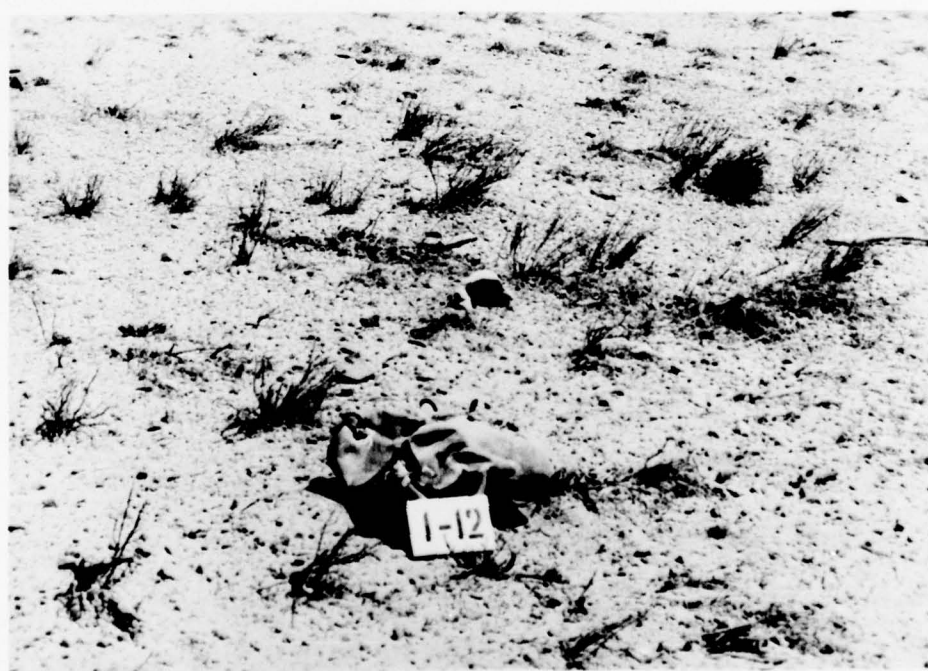






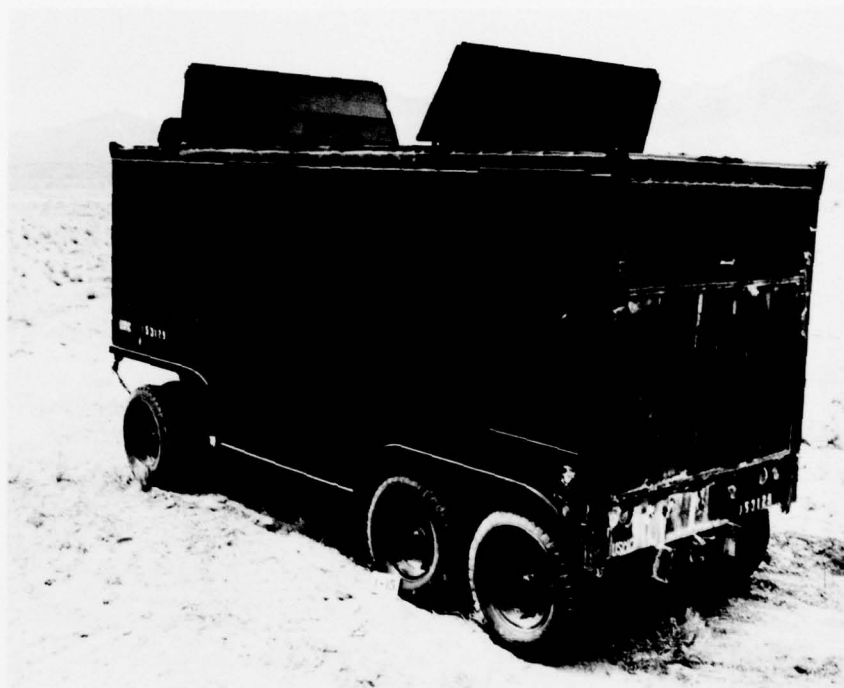


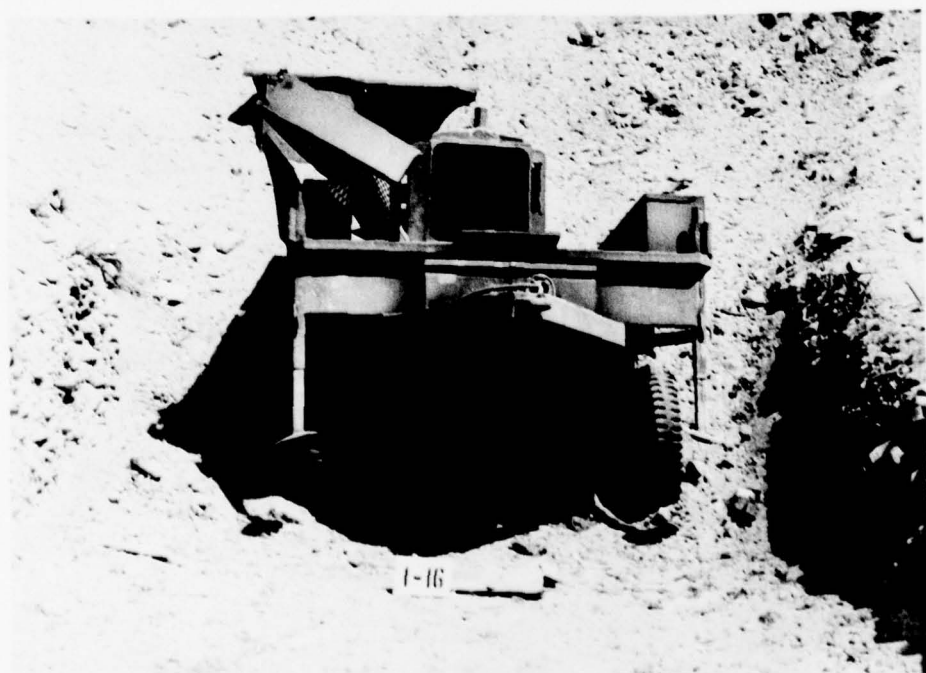
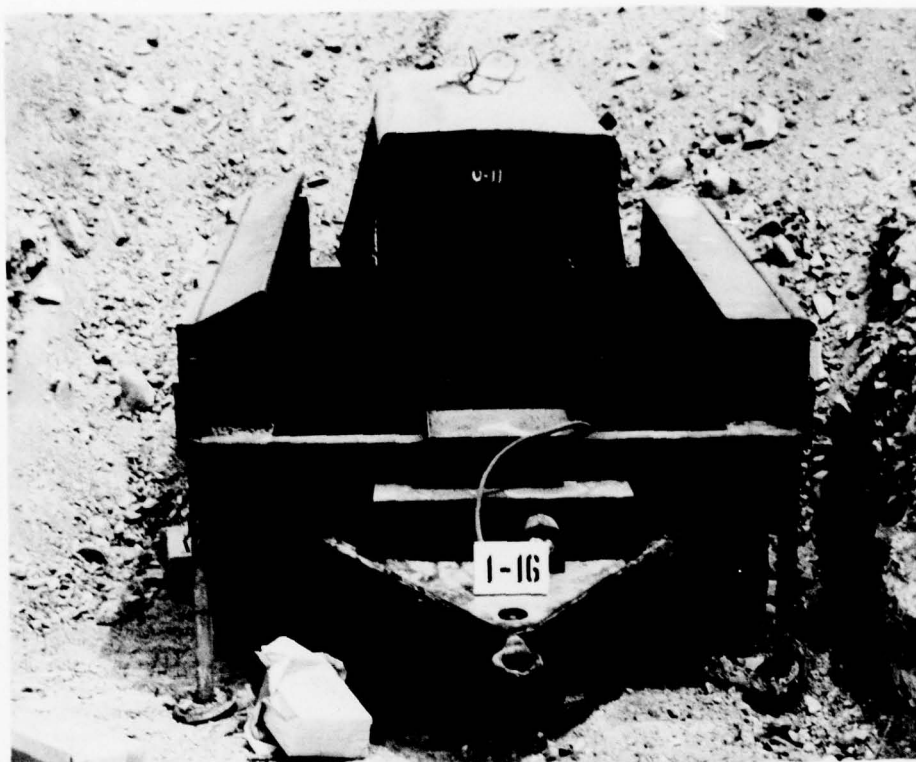


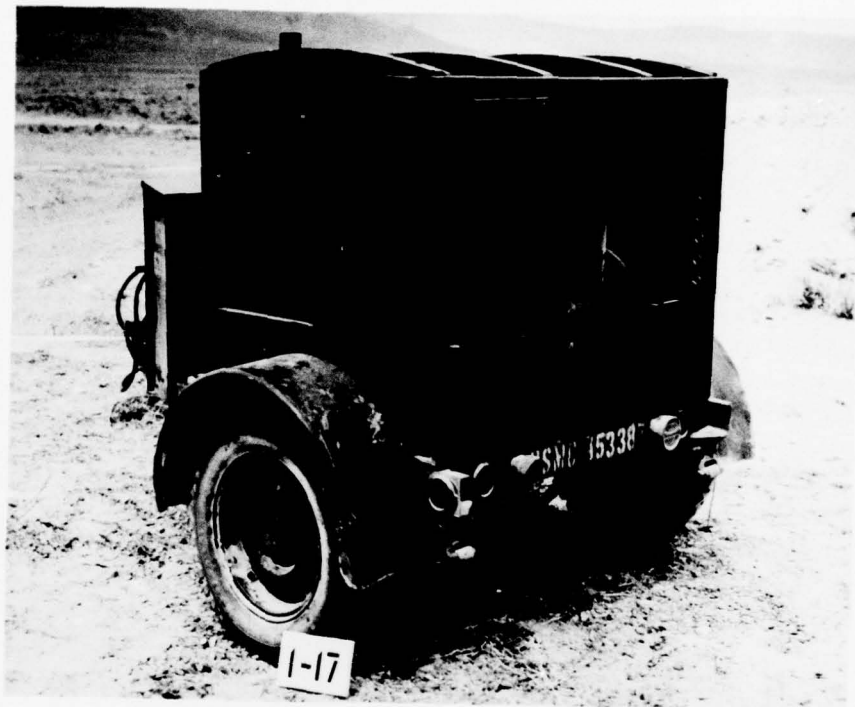






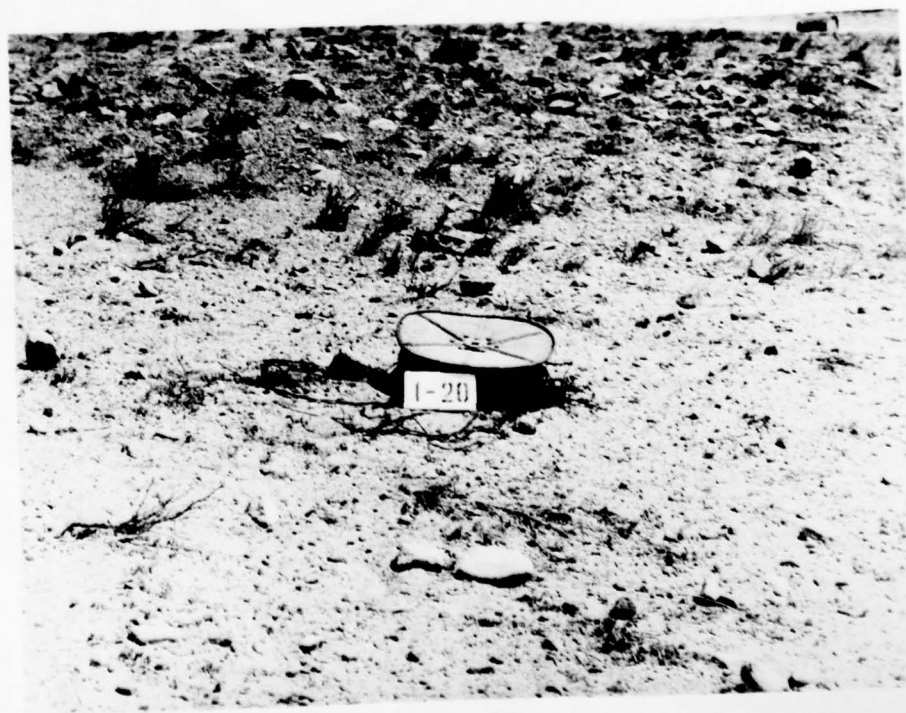
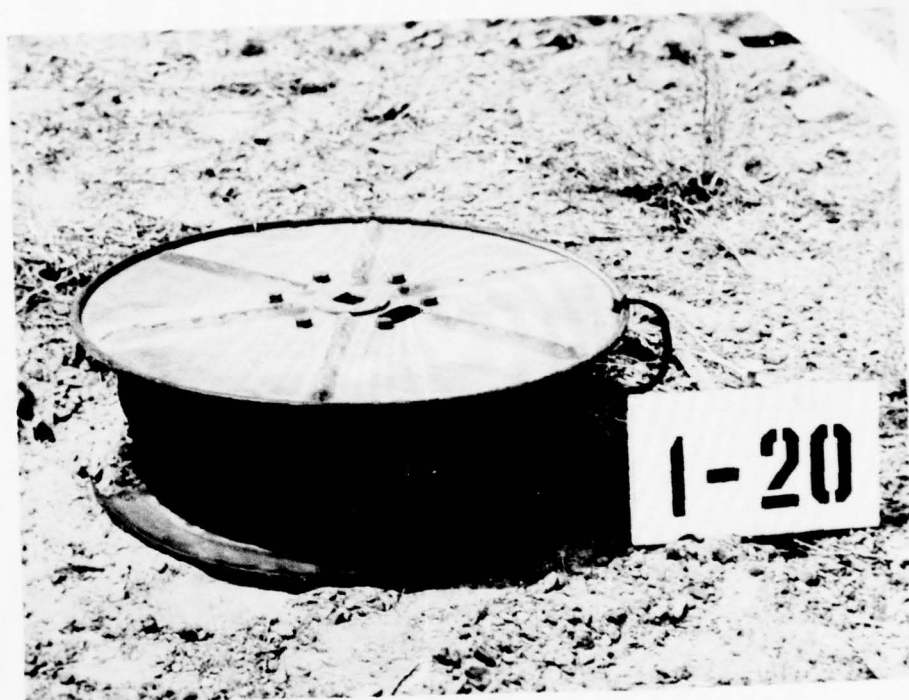






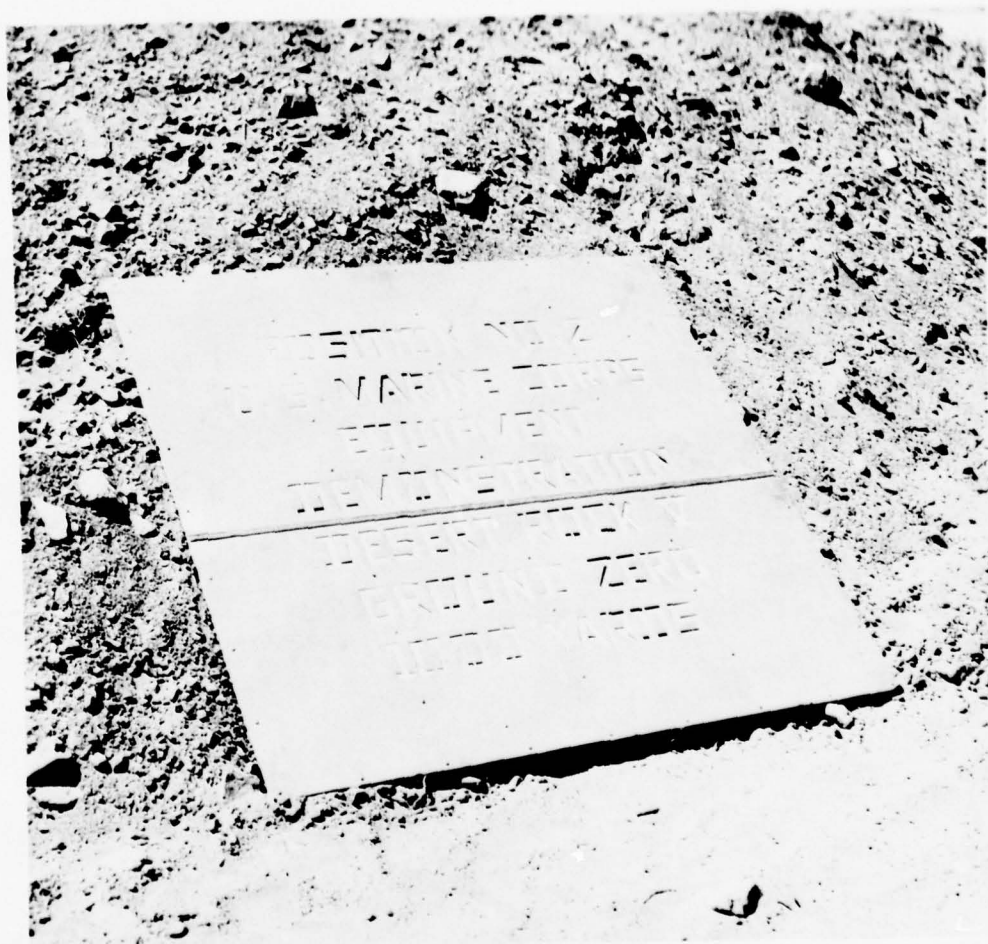
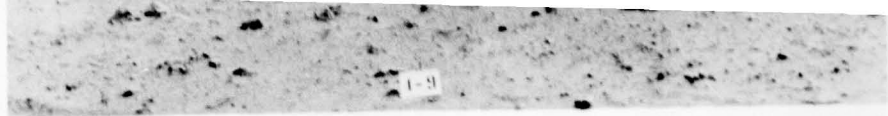


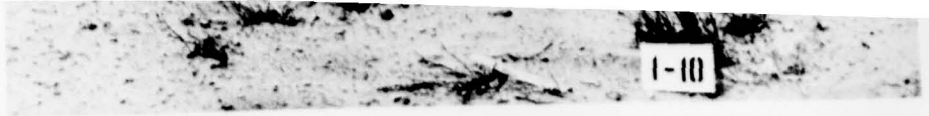


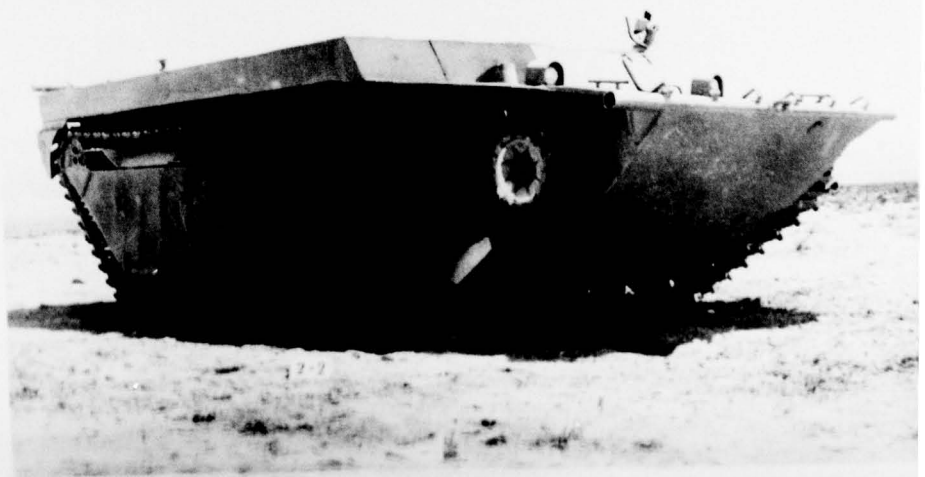
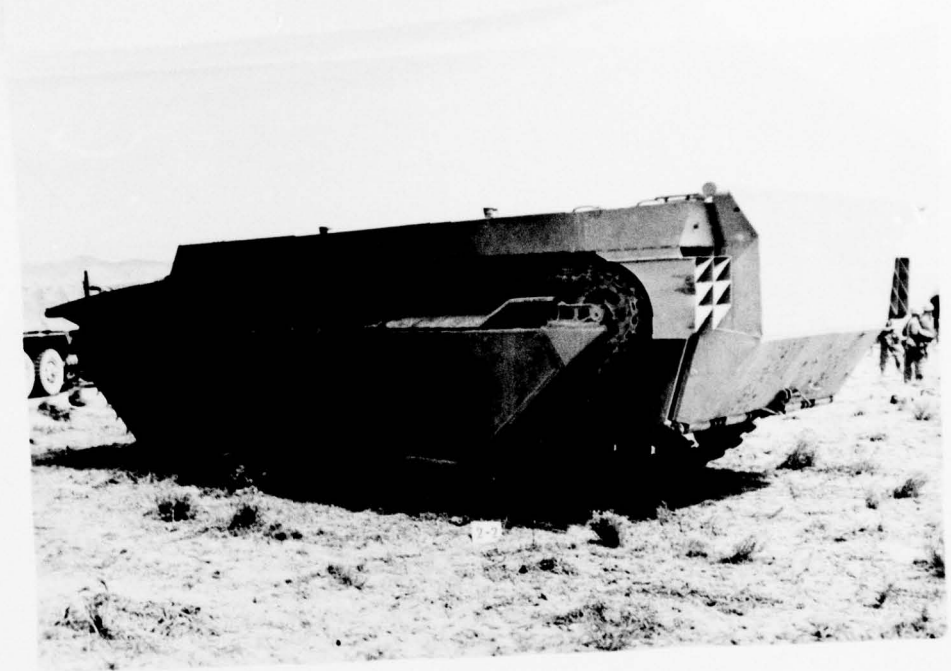


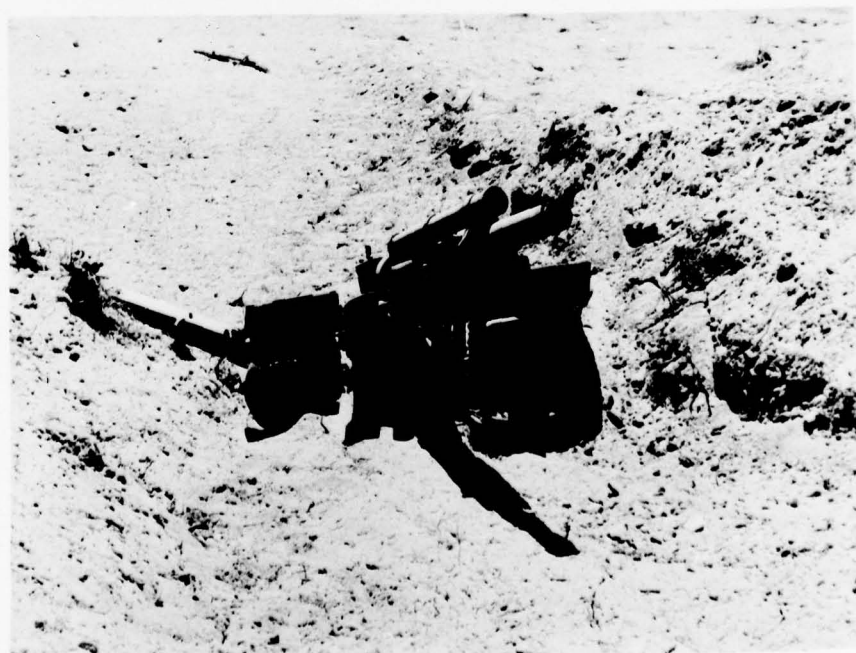
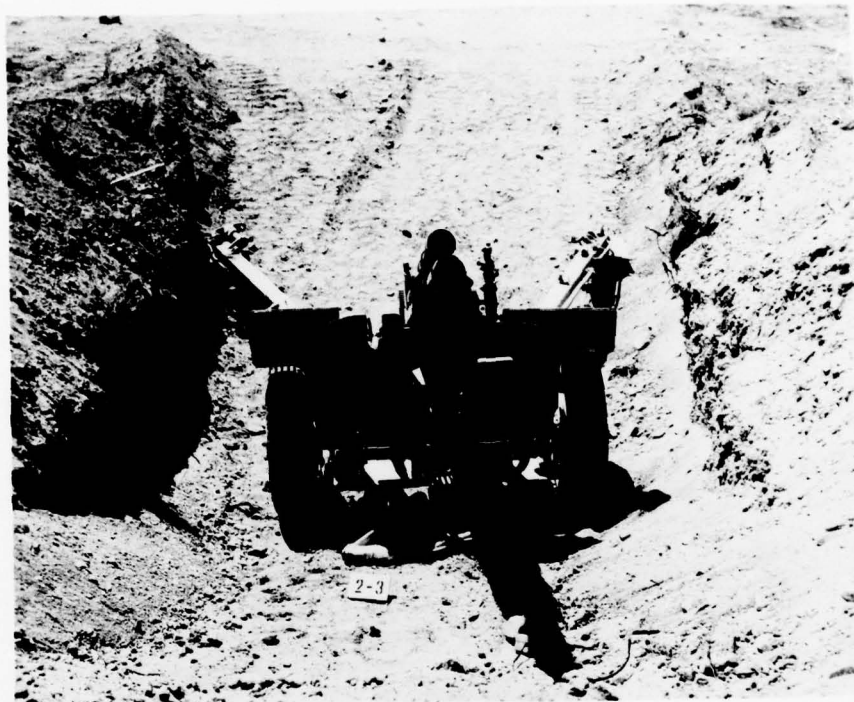








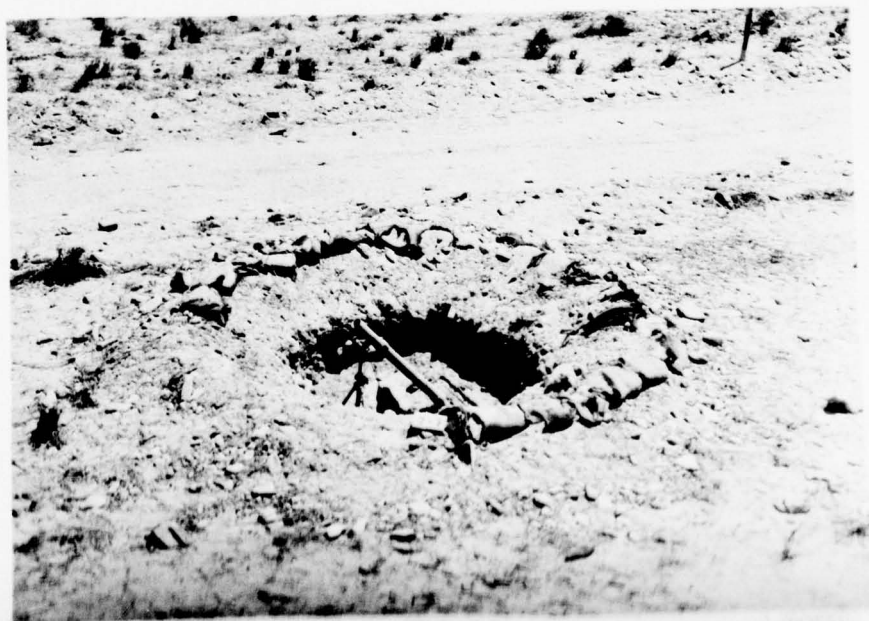


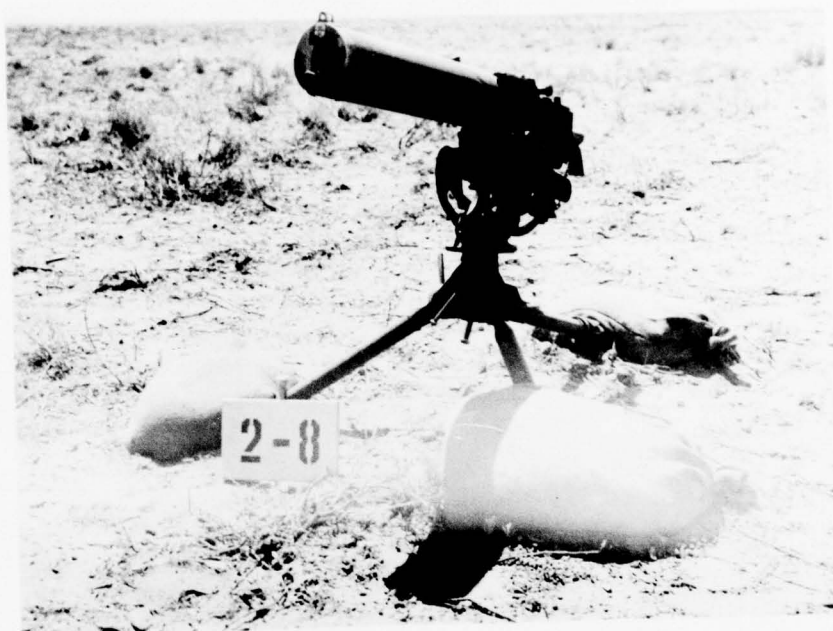
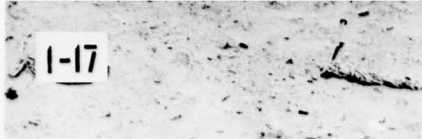
















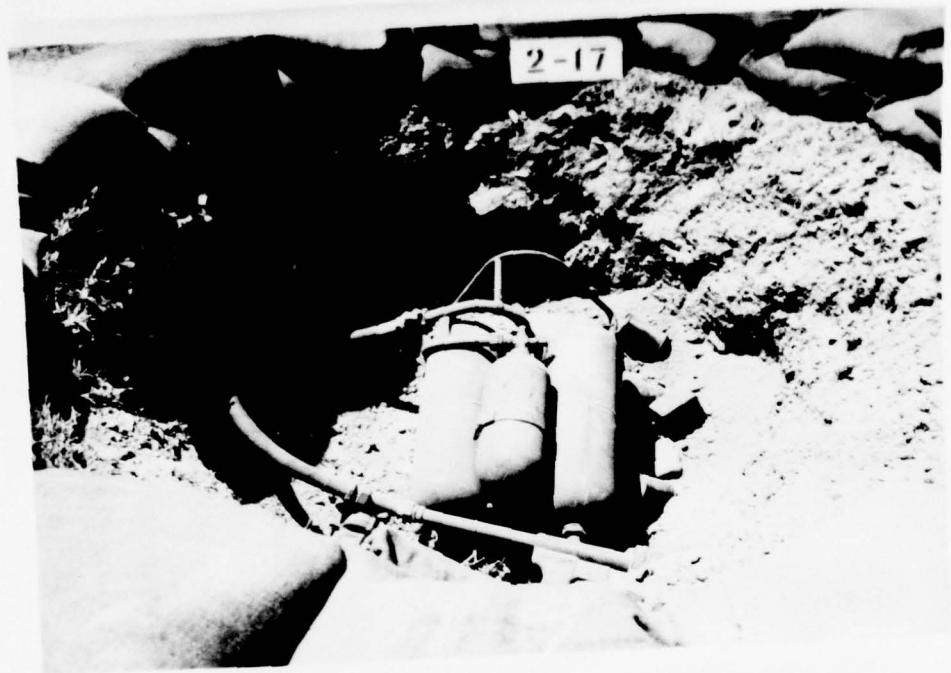










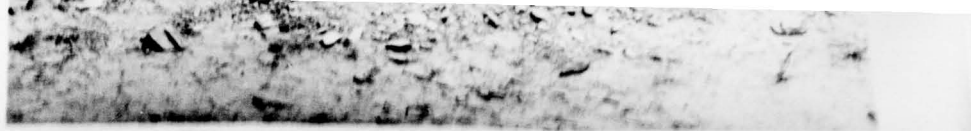










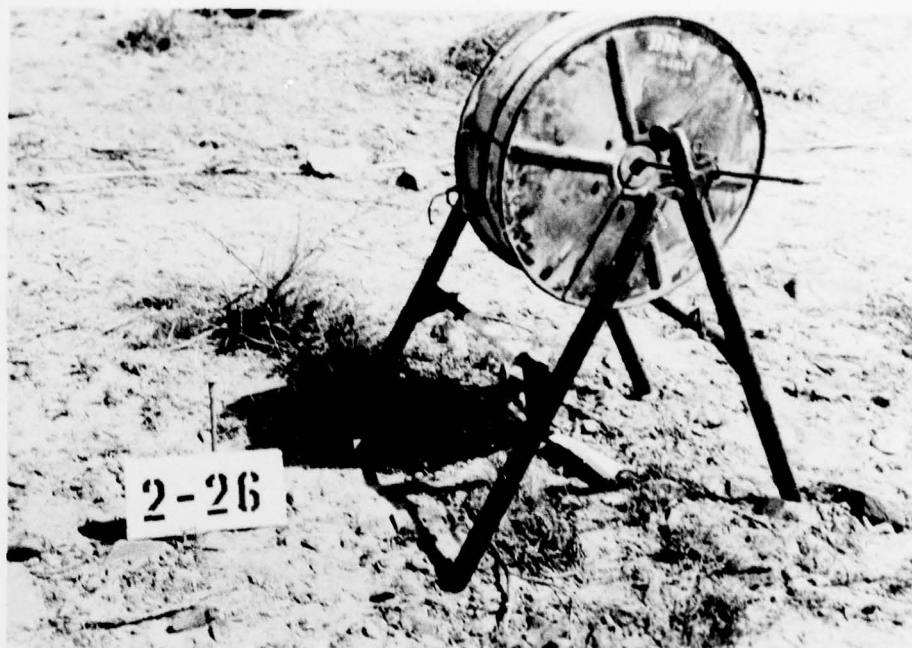










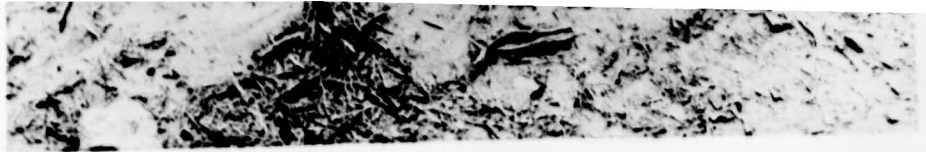


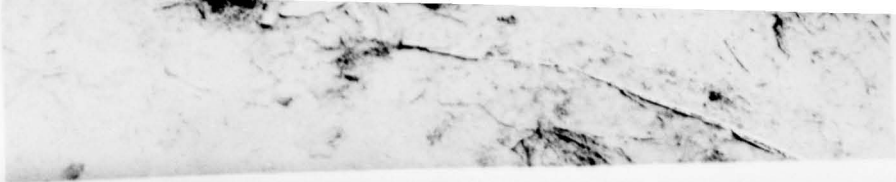






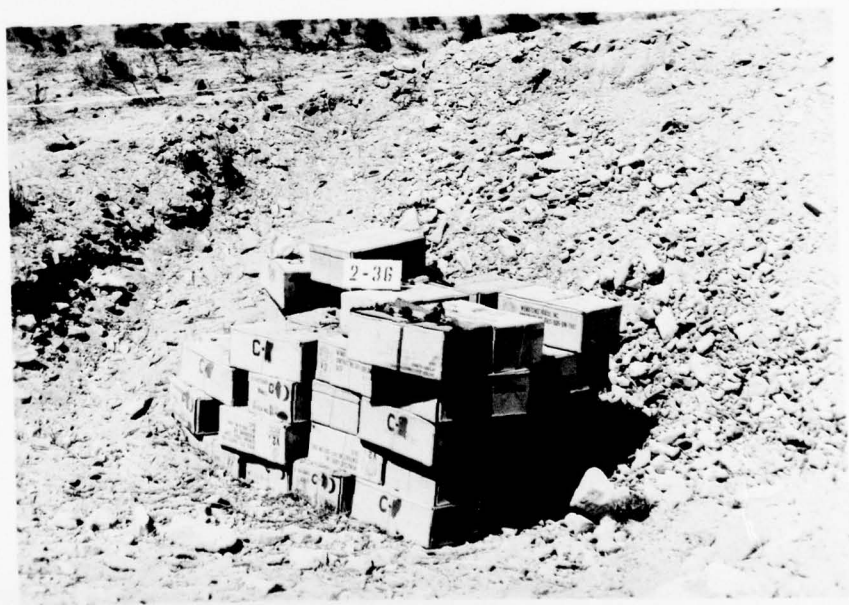
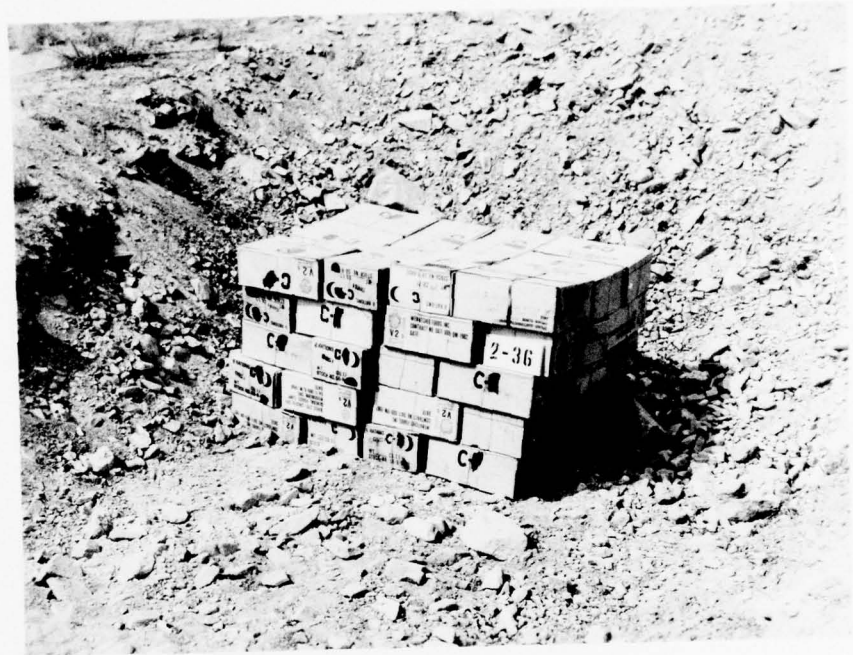


























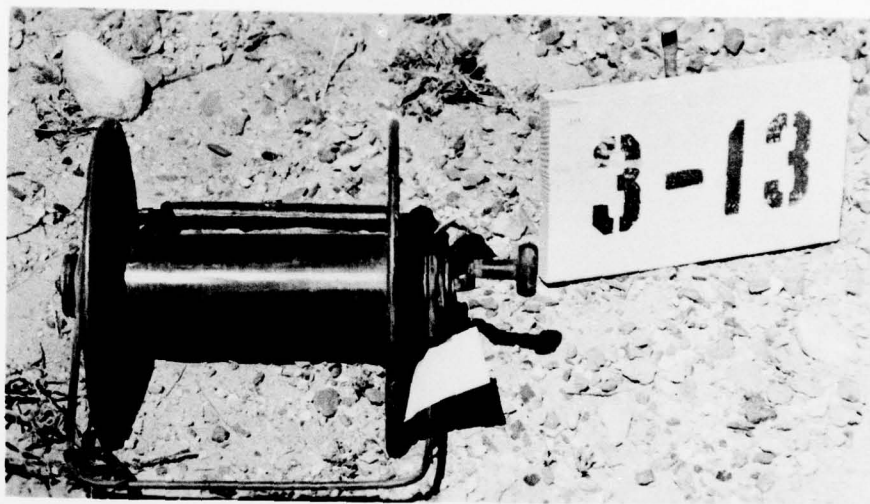






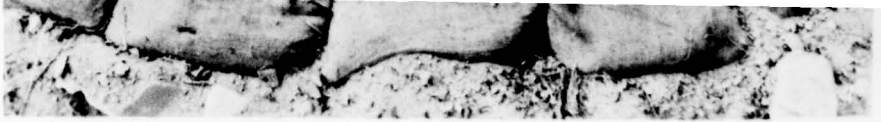
















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EXERCISE DESERT ROCK LAS VEGAS NV

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EXERCISE DESERT ROCK V. ANNEX-ABLE. PHOTOGRAPHIC SUPPLEMENT. EF--ETC(U)

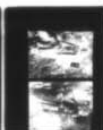
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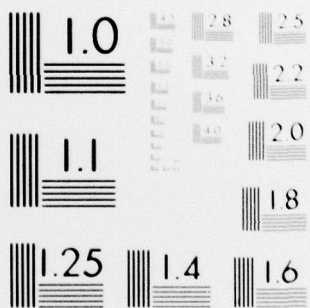


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CHARRED BEYOND RECOGNITION



